(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 October 2001 (11.10.2001)

PCT

(10) International Publication Number
WO 01/74694 A1

(51) International Patent Classification[7]: B65H 1/00, B65D 73/00

(21) International Application Number: PCT/US01/10100

(22) International Filing Date: 29 March 2001 (29.03.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/538,811 30 March 2000 (30.03.2000) US

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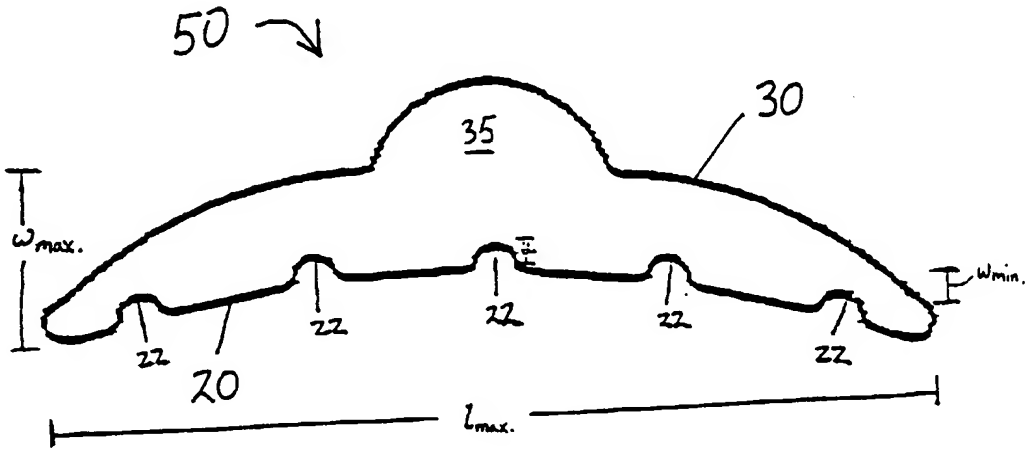
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DISPENSING ORIFICE



(57) Abstract: There is provided a dispensing orifice (10). The edge surfaces of the orifice (10) define a minimum width. The ratio of the minimum width to the thickness of a dispensed sheet (5) is preferably about 2:1 to about 5:1. Also, the surfaces of the orifice (10) define a maximum length, in which the ratio of the maximum length to the thickness of a dispensed sheet (5) is preferably about 8:1 to about 18:1. In a preferred embodiment, at least one of the edge surfaces (20, 30) of the orifice (50) is curved. Moreover, at least one of the edge surfaces (20) has a plurality of nodules (22) extending into the orifice (50).

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DISPENSING ORIFICE

Background of the Invention

1. Field of the Invention

The present invention relates to a container that dispenses pre-moistened sheets. More particularly, the present invention relates to a container having an orifice for dispensing one pre-moistened sheet at a time from a stack or roll of sheets.

2. Description of the Prior Art

There are containers presently available for the purpose of dispensing or emitting a pre-moistened sheet, towelette, or wipe from either a continuous roll or a separately folded stack of sheets.

Pre-moistened sheets, towelettes, or wipes are typically packaged in one of two types of containers, namely a canister or a box. In the canister, the sheets are wound into a continuous roll and perforated to facilitate separation of each sheet from the roll. Sheets are removed from the canister through a dispensing orifice. In the box, the sheets are individually folded and stacked on top of each other. Each sheet is dispensed by opening the lid of the box, reaching in, and removing the top sheet from the stack.

There are inherent problems with both of these types of packages. With the canister, the force needed to separate a sheet from the roll is such that the act of dispensing a sheet is a two-hand operation, one hand to hold the canister, and one hand to pull out the sheet. With the box, a person can reach in with one hand and grab a sheet, but several sheets are often withdrawn at a time because the moisture in the sheets makes the sheets stick together. It is also difficult to find the leading edge of the top sheet.

In an attempt to resolve these dispensing problems, there have been some recent changes to both container designs and the way that the sheets are folded. One design still has the sheets perforated, but they are folded instead of being wound into a roll. The perforations on these wipes are somewhat easier to break than on a canister type package, so that the wipes can generally be dispensed with one hand.

A further improvement is interfolding of the sheets. Interfolding has been used for many years on dry products such as facial tissues. Now, it is being used with moist sheets. Interfolded sheets are easier to dispense than perforated sheet because interfolded sheets lack perforations. However, there are still problems associated with interfolded sheets. Often, such wipes do not dispense one at a time, especially at the bottom of a stack of pre-moistened sheets where each sheet holds more moisture.

Many dispensing problems for interfolded sheets can be attributed to the dispensing orifice. Generally, the dispensing orifices that are commercially available for interfolded sheets have high failure rates. One of the most common problems associated with these orifices is a phenomenon called "roping", wherein more than one sheet is dispensed through the orifice at a time. The number of sheets improperly dispensed per roping incident typically range from two to ten. However, the number of improperly dispensed sheets can be much higher depending on the orifice configuration. For example, tests show that a dispensing container with a common Y-shaped orifice will have an average of about ten roping incidents before the container is empty. On average, about ten sheets are improperly dispensed per roping incident. The common H-shaped orifice arguably performs a little better, since it improperly dispenses, on average, about three sheets per roping incident. However, the common H-shaped orifice has an average of about thirteen roping incidents.

Clearly, there is a need for an improved dispensing orifice for pre-moistened, folded sheets, which orifice prevents roping.

Summary of the Invention

It is the object of the present invention to provide a dispensing container for pre-moistened sheets.

It is another object of the present invention to provide such a dispensing container with a dispensing orifice that minimizes improper dispensing of pre-moistened sheets.

These and other objects of the present invention are achieved by a dispensing orifice as described herein. The edge surfaces of the orifice define a minimum width, wherein the ratio of the minimum width to the thickness of a dispensed sheet is preferably about 2:1 to about 5:1. Also, the surfaces of the orifice define a maximum length, in which the ratio of the maximum length to the thickness of a dispensed sheet is preferably about 8:1 to about 18:1. In a preferred embodiment, at least one of the edge surfaces of the orifice is curved. Moreover, at least one of the edge surfaces preferably has a plurality of nodules extending a distance into the orifice. Preferably, the ratio of the minimum width of the orifice to the distance that the nodules extend into the orifice is about 2:1 to about 8:1.

Brief Description of the Drawings

Figure 1 is a perspective view of a dispensing container with a dispensing orifice according to the present invention;

Figure 2 is a perspective view of the dispensing container of Fig. 1 with a sheet being dispensed through the orifice;

Figure 3 is a plan view of the orifice of Fig. 1;

Figure 4 is a plan view of a second embodiment of a dispensing orifice according to the present invention;

Figure 5 is a plan view of a third embodiment of a dispensing orifice according to the present invention; and

Figure 6 is a plan view of a fourth embodiment of a dispensing orifice according to the present invention.

Detailed Description of the Invention

Referring to the drawings and, in particular, Fig. 1, there is provided a dispensing container generally represented by reference numeral 1. Dispensing container 1 generally may have any shape. However, dispensing container 1 typically has a box shape as shown, or a tubular shape (not shown). In one side or portion of container 1, there is a dispensing orifice 10 adapted to emit a sheet 5 shown in Fig. 2. Sheet 5 is preferably a pre-moistened towelette, wipe, or sheet.

Each preferred configuration of orifice 10 is designed to separate a first emitted sheet from the remaining sheets in container 1 as the sheet is pulled therethrough. Thus, container 1 emits only one sheet at a time.

Referring to Fig. 3, there is illustrated an orifice 50 according to the present invention. Orifice 50 has a first surface or side 20 that is spaced from a second surface or side 30, so that a sheet can pass therebetween. The largest distance between first side 20 and second side 30 is the maximum width of dispensing orifice 50, generally represented as wmax.. The smallest distance between first side 20 and second side 30 is the minimum width of dispensing orifice 50, generally represented as wmin.. The lengths of sides 20, 30 define the maximum length of dispensing orifice 10, which is generally represented as lmax. Both first side 20 and second side 30 are curvilinear so as to create an arcuately shaped orifice. Moreover, second side 30 may have a semi-circular notch 35. The notch 35 allows a user to easily feed a sheet through orifice 50.

It has been found that only one sheet is dispensed through orifice 50 at a time. This is apparently due to the ratio of the minimum width wmin. to average sheet thickness and the ratio of the maximum length lmax. to average sheet thickness.

Side 20 may have one or more nodules 22 that extend a distance d into wmax. Nodules 22 may be in the form of protuberances, tongues, or projections. If there are nodules 22, the distance between nodule 22 and side 30 defines minimum width wmin. The ratio of wmin. to distance d is preferably about 2:1 to about 8:1 and, more preferably, about 2:1 to about 4:1. Preferably, there are between two and five nodules 22. More preferably, there are five nodules 22 on side 20. Optionally, second side 30 may also have one or more nodules (not shown).

Fig. 4 illustrates a dispensing orifice 100 according to the present invention. The dispensing orifice 100 is basically three, hollow, circular areas 60, 70 and 80. Area 70 is positioned between circular areas 60 and 80. The maximum length lmax. of orifice 100 is the total of the diameters of circular areas 60, 70, and 80. As illustrated, circular area 70 is the largest diameter circular area. However, the circular areas may be any diameter so long as areas 60 and 80 arcuately contact area 70, thereby forming two opposed pairs of nodules 90 at opposite sides of circular area 70. The distance between each opposed pair of nodules 90 define the minimum width wmin. of orifice 100. The minimum width wmin. and maximum length lmax. are related to the average thickness of the sheet dispensed through dispensing orifice 100 such that only one sheet is able to pass through orifice 100 at a time.

Fig 5 illustrates a dispensing orifice 300 according to the present invention. Dispensing orifice 300 has an oblong, arcuate center portion 320 and a pair of circular-shaped end portions 330, 340. The center portion 320 preferably has a pronounced arc, so that it is almost a semi-circle. Sides 321 and 322 define the maximum length lmax. of orifice 300.

Each end portion 330, 340 contacts center portion 320 to form two opposed pairs of shoulders 350. The distance the apex or top of the arc of shoulder 250 defines a minimum width wmin. of orifice 300. The top sheet of a stack or roll of sheets will be emitted by orifice 300. Yet, the next or following sheet will not fully emit.

Fig. 6 illustrates dispensing orifice 400 according to the present invention. Dispensing orifice 400 has a hollow, oval-shaped center portion 420 and a pair of outwardly extending oblong portions 410, 430. Portions 410, 420, and 430 are defined by a pair of opposed longitudinal sides 451, 452 and a pair of opposed lateral sides 453, 454. The distance between sides 451 and 452 defines the minimum width wmin. of orifice 400. The distance between sides 453 and 454 defines the maximum length lmax. Like dispensing orifice 300, center portion 420 meets each oblong portion 410, 430 to form a pair of shoulders 450 at each juncture point or surface, thereby defining the minimum width wmin. of orifice 400. The dimensions of orifice 400 are such that the inner surfaces of orifice 400, including shoulders 410,430, are designed to contact a first sheet.

According to the present invention, both the minimum width wmin. of orifice 10 and the maximum length lmax. of orifice 10 are related to the thickness of sheet 5, which is dispensed therethrough. The dimensions of the preferred configurations of dispensing orifice 10 conform to two ratios. First, the ratio of wmin. to the average thickness of a sheet to be dispensed is about 2:1 to about 5:1 and, more preferably, about 2.9:1 to about 3.6:1. Second, the ratio of lmax. to sheet thickness is about 8:1 to about 18:1 and, more preferably, about 10:1 to about 17:1. Furthermore, in all embodiments of the orifice according to the present invention, at least one surface or side is curvilinear.[PLEASE CONFIRM] The shape of the orifice can vary widely as long as either (1) at least one side of orifice 10 is curvilinear [PLEASE CONFIRM] and (2) either one or both of the ratios described above are maintained.

Chart A summarizes the results of dispensing studies in which its minimum width wmin. was varied according to sheet thickness. This chart shows that the size of the orifice is related to performance, since less roping occurred when thinner sheets were emitted from an orifice having a smaller wmin.. In addition, when roping occurred, fewer sheets were improperly dispensed when narrower width w dispensed thinner sheets. Similar observations were noted when thicker sheets were dispensed through a larger wmin., as shown in Chart B.

Chart A – Roping and Improper Dispensing of Towelettes having a Fabric Thickness of .012" to .013"

Dispensing Orifice No. (Fig. No.)	Average Number of Incidents of Roping per Container	Average Number of Sheets Improperly Dispensed per Container	Narrowest Width of Orifice in Inches (wmin.)
1 (Fig. 3)	9.5	22.8	0.250
2 (Fig. 3)	1.2	2.4	0.125
3 (Fig. 4)	12.1	34.2	0.250
4 (Fig. 4)	4.3	6.0	0.125
5 (Fig. 5)	11.0	26.2	0.250
6 (Fig. 5)	3.6	7.7	0.125
7 (Fig. 6)	6.6	25.2	0.250
8 (Fig. 6)	2.5	6.0	0.125

Chart B – Roping and Improper Dispensing of Towelettes having a Fabric Thickness of .014" to .015"

Dispensing Orifice No.	Average Number of Incidents of Roping per Container	Average Number of Sheets Improperly Dispensed per Container	Narrowest Width of Orifice in Inches
1	0	0	0.250
3	0	0	0.250
5	0	0	0.250
7	0	0	0.250

The present invention having been thus described with particular reference to the preferred form thereof, it will be obvious that various changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

Wherefore We Claim:

1. An orifice for dispensing a sheet having an average thickness, said orifice having a minimum width, wherein the ratio of said minimum width of said orifice to said average thickness of said sheet is about 2:1 to about 5:1.

2. The orifice according to claim 1, wherein said ratio is about 2.9:1 to about 3.6:1.

3. An orifice for dispensing a sheet, said orifice having at least one pair of opposing sides that define a maximum width for said orifice, wherein at least one of said pair of opposing sides has one or more nodules that extend a distance into said maximum width and thereby define a minimum width for said orifice, whereby the ratio of said minimum width to said distance is about 2:1 to about 8:1.

4. The orifice according to claim 3, wherein the ratio of said minimum width to said distance is about 2:1 to about 4:1.

5. The orifice according to claim 3, wherein said orifice has 2 to 5 nodules extending into said maximum width.

6. The orifice according to claim 5, wherein said orifice has 5 nodules extending into said maximum width.

7. An orifice for dispensing a sheet having an average thickness, said orifice having a maximum length, wherein the ratio of said maximum length of said orifice to said average thickness of said sheet is about 8:1 to about 18:1.

8. The orifice according to claim 7, wherein said ratio is about 10:1 to about 17:1.

9. A container for dispensing a plurality of pre-moistened sheets, each sheet having an average thickness, wherein said container has an orifice through which each pre-moistened sheet is emitted, said orifice having a plurality of edge surfaces that define a maximum width and a maximum length for said orifice, said orifice having one or more nodules extending a distance into said maximum width from at least one of said edge surfaces, said nodules defining a minimum width for said orifice, whereby the ratio of said minimum width to said average thickness of each sheet is about 2:1 to about 5:1, and whereby the ratio or said maximum length to said average thickness is about 8:1 to about 18:1.

10. The container according to claim 9, wherein the ratio of said minimum width to said average thickness is about 2.9:1 to about 3.6:1.

11. The container according to claim 9, wherein the ratio of said maximum length to said average thickness is about 10:1 to about 17:1.

12. The container according to claim 9, wherein the ratio of said minimum width to said distance that said nodules extend into said maximum width is about 2:1 to about 8:1.

13. The container according to claim 12, wherein the ratio of said minimum width to said distance is about 2:1 to about 4:1.

14. The container according to claim 9, wherein said orifice has two to five nodules.

15. The container according to claim 9, wherein said orifice has five nodules.

16. The container of claim 9, wherein said orifice is curvilinear.

17. The container of claim 16, wherein said orifice is arcuately shaped.

18. The container of claim 16, wherein said orifice has a plurality of substantially circular-shaped regions.

19. The container of claim 16, wherein said orifice has a substantially circular-shaped center region and a plurality of substantially oblong end regions.

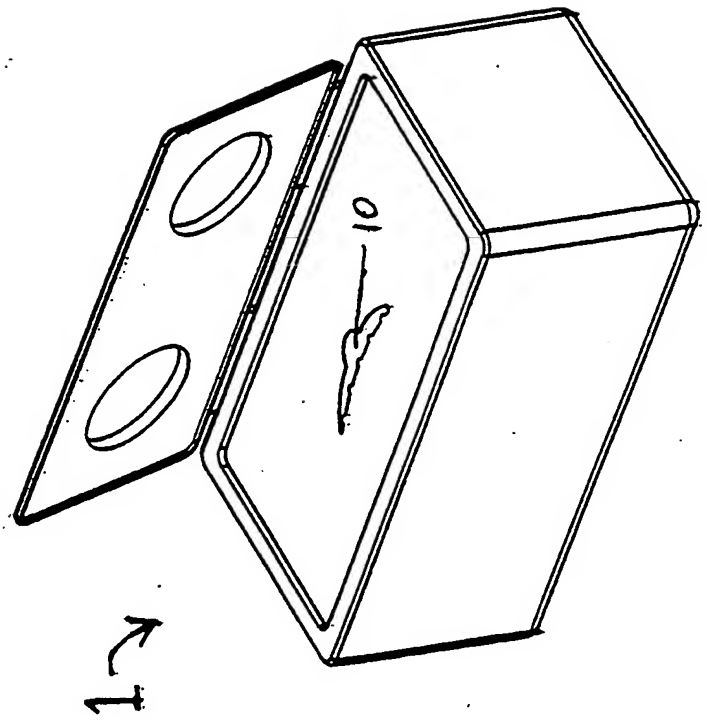


Figure 1

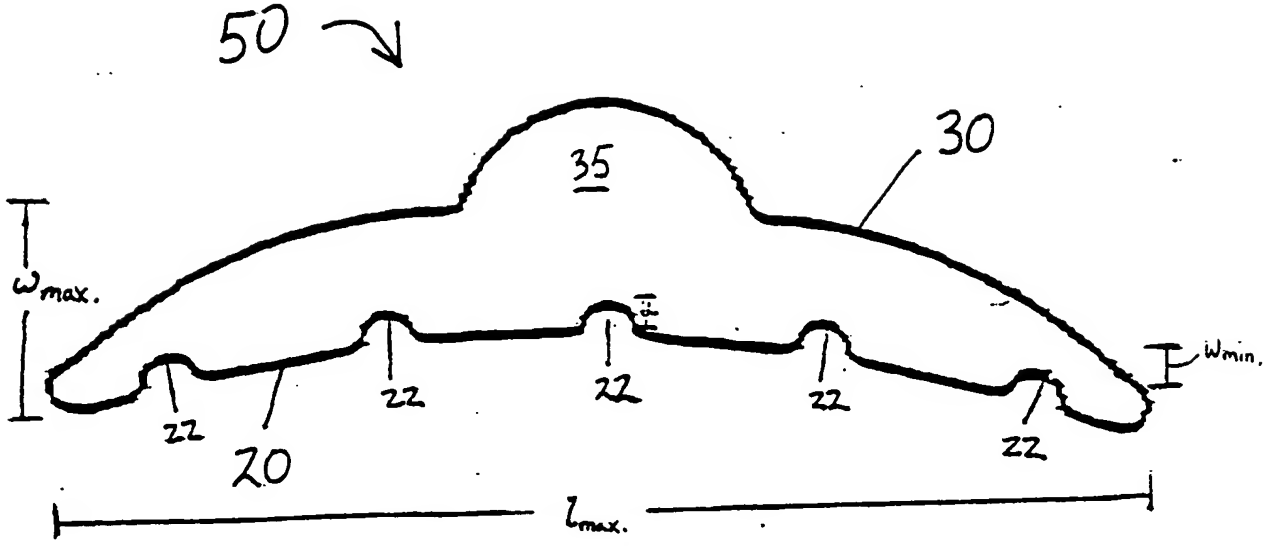
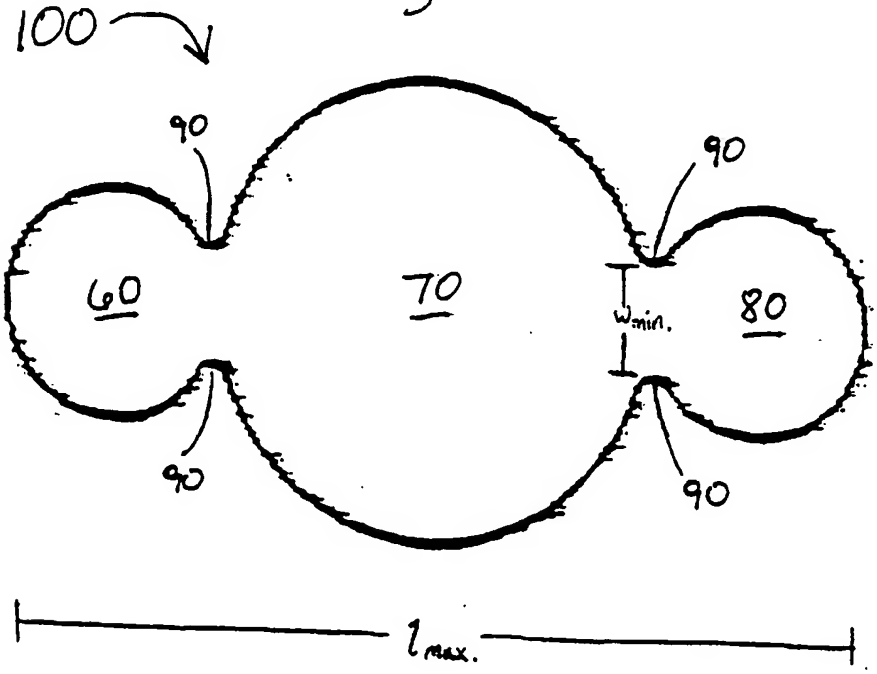

50
35
30
$w_{max.}$
$w_{min.}$
22
22
22
22
22
20
$l_{max.}$

Fig. 3

Fig. 4


100
90
90
60
70
80
$w_{min.}$
90
90
$l_{max.}$

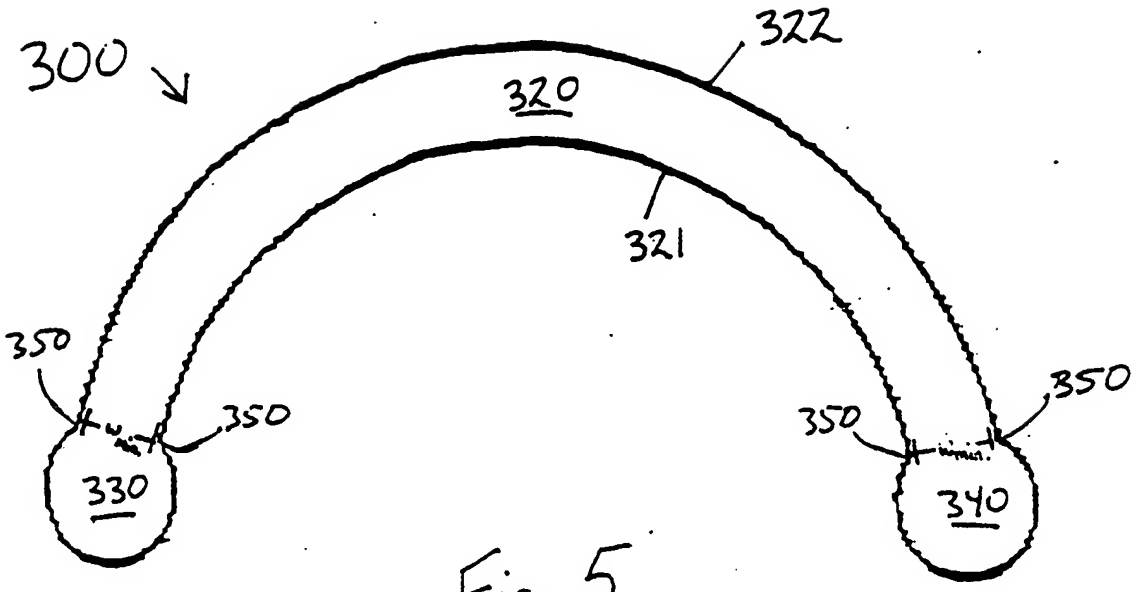

300
322
320
321
350
350
350
350
330
340

Fig. 5

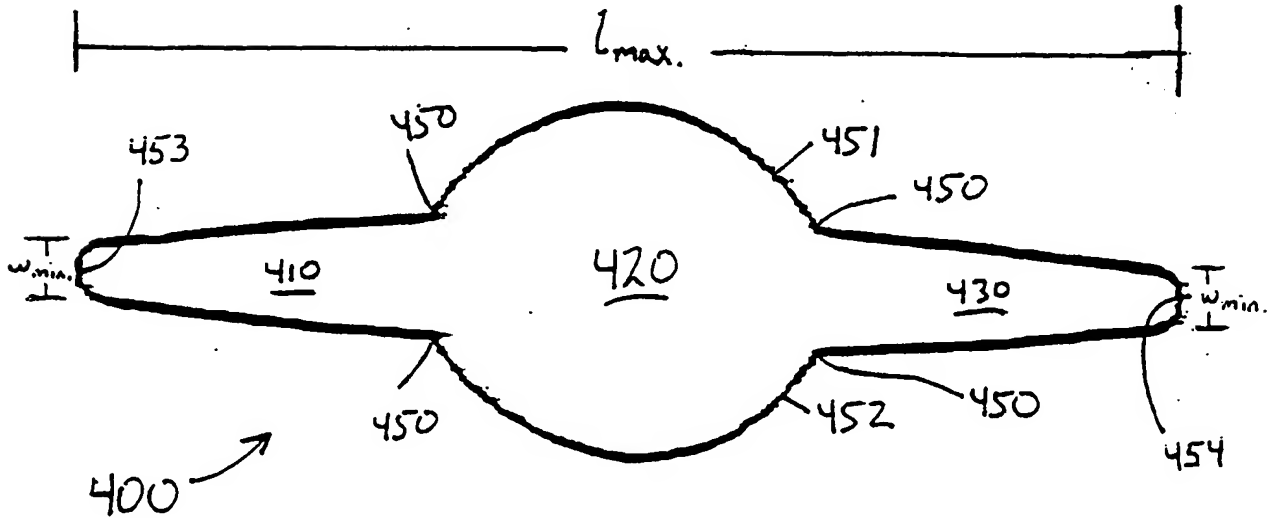

$l_{max.}$
453
450
451
450
410
420
430
$w_{min.}$
$w_{min.}$
450
452
450
454
400

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/10100

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B65H 1/00 ; B65D 73/00
US CL : 221/63 ; 206/494

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 221/48,45,63,33,302; 206/409,494,812,233

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T, P	US 6,053,357 A (YOH) 25 APRIL 2000 (25.04.00), see the entire document.	1-19
A	US 5,219,421 A (TIPPING) 15 JUNE 1993 (15.06.93), see the entire document.	1-19

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 May 2001 (10.05.2001)	22 JUN 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Kenneth Noland Telephone No. (703) 308-3200

Form PCT/ISA/210 (second sheet) (July 1998)